



CH2M HILL
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Otis ANGB, MA 02542

25 October 2013

Mr. Jonathan S. Davis
Remediation Program Manager
HQ AFCEC/JBCC
322 East Inner Road
Otis ANG Base, MA 02542-5028

SUBJECT: AFCEC FA8903-08-D-8769-0337; Task Order 0337
MMR SPEIM/LTM/Optimization Program
CDRL #A001o
**Final Explanation of Significant Differences for the Landfill-1 (LF-1)
Source Area at the Massachusetts Military Reservation**

Dear Mr. Davis:

As directed by the Air Force Civil Engineer Center, CH2M HILL is hereby distributing copies of the *Final Explanation of Significant Differences for the Landfill-1 (LF-1) Source Area at the Massachusetts Military Reservation* dated September 2013. Enclosed are four bound copies, one unbound copy, and three compact disc (CD) copies. Copies are also being sent to the appropriate agencies.

If you have any questions or comments, please contact Jon Davis at (508) 968-4670, extension 4952.

Sincerely,

CH2M HILL

A handwritten signature in black ink, appearing to read "N. Tindall".

Nigel Tindall, P.G.
Project Manager

Enclosures: (4 bound, 1 unbound & 3 CDs)

- c. Rose Forbes, AFCEC/JBCC
772d ESS/PKJ (1 w/o attach.)
- Bob Lim, EPA (1 bound, 1 CD)
- Lynne Jennings, EPA (1 CD)
- Erin Sanborn, EPA/OSSR RIC (1 bound, 1 CD)
- Leonard Pinaud, MassDEP (1 bound, 1 CD)
- Henry Ciu, MassDEP (1 CD)
- Elliot Jacobs, MassDEP (1 CD)
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Massachusetts Military Reservation



Final
Explanation of Significant Differences
for the Landfill-1 (LF-1) Source Area at the
Massachusetts Military Reservation

September 2013

Prepared for:
AFCEC/MMR
Installation Restoration Program
322 E. Inner Road
Otis ANGB, MA 02542

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ACRONYMS AND ABBREVIATIONS

AFCEC	Air Force Civil Engineer Center
AFCEE	Air Force Center for Engineering and the Environment
ANG	Air National Guard
AOC	area of concern
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (Superfund)
CFR	Code of Federal Regulations
EPA	U.S. Environmental Protection Agency
ESD	Explanation of Significant Differences
FFA	Federal Facility Agreement
FS	feasibility study
GP	Gun Position
GW-1	MCP Groundwater-1 Standard
IAGWSP	Impact Area Groundwater Study Program
IRP	Installation Restoration Program
LF-1	Landfill-1
LUCs	land use controls
MassDEP	Massachusetts Department of Environmental Protection
MCP	Massachusetts Contingency Plan
MMR	Massachusetts Military Reservation
NCP	National Contingency Plan
NGB	National Guard Bureau
NPL	National Priorities List
NWOU	Northwest Operable Unit

ACRONYMS AND ABBREVIATIONS

PAH	polycyclic aromatic hydrocarbon
PCM	post-closure monitoring
RI	remedial investigation
ROD	Record of Decision
S-1	MCP Soil-1 Standard
USAF	U.S. Air Force
VOC	volatile organic compound

1.0 INTRODUCTION

This Explanation of Significant Differences (ESD) has been prepared to document changes to the selected remedy for the Landfill-1 (LF-1) source area; the selected remedy for LF-1 groundwater will remain unchanged. The LF-1 Record of Decision (ROD) was signed on 24 September 2007 by the Air Force Center for Engineering and the Environment (AFCEE) and on 28 September 2007 by the U.S. Environmental Protection Agency (EPA). This Installation Restoration Program (IRP) site is associated with the Massachusetts Military Reservation (MMR), located on Cape Cod, Massachusetts ([Figures 1-1](#) and [1-2](#)). The Comprehensive Environmental Response, Compensation, and Liability Information System number for the MMR site is MA2570024487. This ESD was prepared in accordance with *A Guide to Preparing Superfund Proposed Plans, Records of Decision, and Other Remedy Selection Decision Documents* (EPA 1999).

In accordance with Executive Order 12580, the U.S. Air Force (USAF) is the lead agency for remedial actions at the MMR and this document is being issued by the USAF as the lead agency. The MMR was formally added to the National Priorities List (NPL) in 1989. A Federal Facility Agreement (FFA), which provided the legal framework for investigating and remediating numerous operable units at the MMR, was signed in 1991 (EPA et al. 1991). In 1996, the FFA was amended to add the USAF as the lead agency for the cleanup at MMR (EPA et al. 2002). The FFA, as amended, requires the USAF to implement Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) requirements at MMR. In addition to the USAF, the EPA and National Guard Bureau (NGB) are parties to the FFA for the MMR. The Massachusetts Department of Environmental Protection (MassDEP) is not a signatory of the FFA, but is an active participant in the clean-up process and provides guidance and direction to the remedy selection and oversight process.

The NWOU is currently regulated by MassDEP permit pursuant to M.G.L. c.111, s.150A and the Massachusetts Solid Waste Regulations, 310 CMR 19.000. A Provisional Approval with Conditions, Application for BWP SW23 Comprehensive Site Assessment & Corrective Action Alternative Analysis, Transmittal # W070768 was issued on 20 April 2007 for the NWOU which required, among other conditions, landfill gas monitoring and a 30-year period

of post-closure groundwater monitoring (AFCEE 2012). Upon finalization of this ESD, the NWOU will no longer be regulated by MassDEP under the cited permit, but instead will be regulated by EPA pursuant to CERCLA.

A portion of the LF-1 source area, the Northwest Operable Unit (NWOU), was excluded from the LF-1 ROD due to EPA concerns regarding surface soil contamination related to former Gun Positions (GPs) (Old GP-2 and Old GP-3) that were used on the NWOU after the landfill cells were closed ([Figure 1-2](#)). The Impact Area Groundwater Study Program (IAGWSP) has addressed EPA's concerns regarding the NWOU surface soil contamination (IAGWSP 2012), allowing this decision document to be completed in order to include the NWOU in the LF-1 source area remedy.

1.1 STATEMENT OF PURPOSE


The Air Force Civil Engineer Center (AFCEC)¹ is issuing this ESD in accordance with §117(c) of CERCLA and 40 Code of Federal Regulations (CFR) Section 300.435(c)(2)(i) of the National Contingency Plan (NCP) which requires the publication of an ESD to describe the significant difference(s) between the selected remedial action and the modified remedial action, including an explanation of why such changes were made. As required by Section 300.825(a)(2) of the NCP, this ESD will become part of the Administrative Record for the LF-1 IRP Site at the MMR. The Administrative Record is available for public review at the AFCEC IRP Office (322 East Inner Road, Otis ANG Base, Massachusetts, 02542) Monday - Friday, 8 a.m. to 4 p.m., excluding federal and state holidays.

¹ In October 2012, AFCEE adopted a new organizational name (AFCEC). Therefore, the AFCEE and AFCEC acronyms refer to the same entity, but are used in this document in relation to the date of a specific topic or document.

1.2 AUTHORIZING SIGNATURES

The following signatures represent the decision to authorize this ESD.


U.S. AIR FORCE



JOE SCIABICA
Director
Air Force Civil Engineer Center

Date: 23 Sep 2013

U.S. ENVIRONMENTAL PROTECTION AGENCY



JAMES T. OWENS III
Director
Office of Site Remediation and Restoration

Date: 09/30/13

2.0 SITE HISTORY, SITE CONTAMINATION, AND SELECTED REMEDY

This section presents background information on the LF-1 IRP source area site, including an overview of the physical and chemical characteristics, history, and selected remedy.

2.1 INSTALLATION LOCATION AND HISTORY

The MMR, listed on the NPL as Otis Air National Guard/Camp Edwards, is located on upper Cape Cod, Massachusetts ([Figure 1-1](#)). The source area for IRP site LF-1 is located entirely within the MMR ([Figure 1-2](#)).

The MMR comprises approximately 22,000 acres on Cape Cod and provides facilities for several operating command units: the Massachusetts Air National Guard (ANG), the Army National Guard, the USAF, the U.S. Coast Guard, and the Veterans Affairs. Past military training, maneuvers, and aircraft operations, maintenance and support activities at the MMR have resulted in releases of hazardous materials that contaminated soil in source areas and generated plumes of contaminated groundwater in the unconfined sand and gravel aquifer that underlies the MMR and the surrounding towns.

2.2 LF-1 SOURCE AREA HISTORY, CONTAMINATION, AND REMEDIAL ACTIONS

The LF-1 source area is a solid waste landfill located in the southern portion of the MMR and is bounded by Turpentine Road to the east, Frank Perkins Road to the west, Herbert Road to the north, and Connery Avenue to the south ([Figure 1-2](#)). The LF-1 landfill was utilized between 1941 and 1990 as the primary solid waste disposal facility at MMR. Waste was reportedly disposed at the landfill in five distinct cells and a natural Kettle Hole. The cells are designated by the year representing the approximate last date of waste disposal. LF-1 consists of three capped cells (1970 cell, post-1970 cell, and Kettle Hole), and three older uncapped cells (1947, 1951, and 1957) ([Figure 1-2](#)). The three older cells are referred to as the NWOU, which encompass approximately 40 acres and is covered by relatively dense vegetation (i.e., grass, brush, and trees). The capped cells occupy approximately 50 acres. The thickness of waste burial has not been

accurately determined, but is estimated to be about 20-feet thick for the 1970 and Post-1970 cells; while the thickness of waste in the Kettle Hole is unknown (E.C. Jordan Co. 1988 and 1990a).

In 1983, a records search identified the landfill as a potential source for volatile organic compounds (VOCs) first detected in June 1979 in a base water supply well (the G well) located approximately 6,000 feet downgradient of the landfill (ANG 1983). The G well was capped and has not been operational since 1985. In 1985, an initial site investigation of the landfill was conducted and indicated there was minor evidence of landfill-derived leachate based on the presence of VOCs detected during monitoring well installation and sampling (ANG 1985). Magnetic anomalies and the disposal boundaries were delineated through magnetometer and radar surveys of the landfill (E.C. Jordan 1990b). Soil gas data indicated that waste buried in the landfill emitted a wide variety of VOCs and that landfill gases related to the degradation of organic material (including methane) were being released to the atmosphere (E.C. Jordan 1990b). The initial site investigation confirmed that contamination leaching from LF-1 was contributing to groundwater contamination (ANG 1985).

From 1987 to 1989, an interim remedial investigation (RI) was performed to further evaluate the impact of each landfill cell to groundwater, estimate the potential for each cell to be a continuing source of groundwater contamination, and to develop a conceptual model for the plume (E.C. Jordan 1990a). Groundwater data collected during 1989-1990 (ANG 1993a) indicated that significant contamination was not emanating from the older NWOU cells (1947, 1951, and 1957). An environmental justification report indicated that the NWOU was not a source of contamination and that it did not pose a public health risk or environmental hazard (ANG 1991). Hence, recommendations were made for no additional action (i.e., landfill cover) at the NWOU.

The LF-1 RI was conducted between 1992 and 1994 (AFCEE 1996). The RI human health risk assessment indicated that future groundwater use posed a potential risk. The RI recommendations included aquifer testing, the development of an LF-1-specific groundwater flow and transport model, and additional data gap investigation work to be

conducted as part of feasibility study (FS) activities. A focused FS for the Area of Concern (AOC) LF-1 identified a number of potential remedial alternatives for the landfill to reduce contaminants leaching to the groundwater (ABB-ES 1992). The interim remedial action for the landfill (ANG 1993b) consisted of the following actions:

1. Leaving NWOU wastes in place beneath the native soil and vegetative cover and installing downgradient groundwater monitoring wells to assess any impacts from the older cells and to determine if the interim remedial action is an appropriate long-term remedial action. Monitoring wells were selected for sampling on a regular basis.
2. Construction of a landfill cover system on the 1970 and Post-1970 cells and the Kettle Hole.
3. Preparation of a Post-Closure Monitoring (PCM) Plan for the 1970 and post-1970 cells and the Kettle Hole.

Closure activities at the landfill, included capping three cells and instituting PCM, were completed in 1995. Landfill caps on the three most recently used cells (1970, Post-1970, and Kettle Hole) were constructed because these cells were the apparent sources of groundwater contamination (ANG 1992). The primary purpose of the landfill cover and associated drainage structures is to minimize the amount of precipitation that infiltrates the landfill and produces leachate that drains into the aquifer. The LF-1 cover system is composed of a low permeability cap built on top of the three cells, an associated cover drainage system, and 70 passive gas vents designed to release gas from the interior of the landfill and minimize the potential for lateral gas migration. Gas probes are located around the perimeter of the capped cells and NWOU to monitor subsurface vapor. A perimeter fence already existed around the entire landfill (capped cells and NWOU) at the time of capping.

Subsequent to the Interim ROD, the final ROD (AFCEE 2007) documents the selected remedy for the LF-1 source area (the 1970 and post-1970 cells, and the Kettle Hole) and provides for continued monitoring and maintenance of the existing landfill cover system (AFCEE 2007). The objective of the remedy is to retard leaching of contamination that would cause downgradient groundwater to be unusable and implement land use controls (LUCs) to prevent exposure to landfill waste. Soil sample results collected by the

IAGWSP at Old GP-2 and Old GP-3 on the NWOU during the time that the LF-1 ROD was being developed indicated that further investigation was necessary (see Section 3.0). Therefore, the NWOU cells were not included in the LF-1 ROD source area remedy.

The selected remedy presented in the ROD (AFCEE 2007) for groundwater included:

1. Continued operation of the LF-1 treatment system installed as part of the interim remedial design with the installation of one additional extraction well (27EW0006) south of 27EW0002 to increase capture of the southern portion of the LF-1 plume ([Figure 1-2](#)),
2. LUCs, and
3. The Bourne Water Provision (AFCEE funding to replace the lost capacity from Bourne Public Water Supply Wells 2 and 5) (AFCEE 2007).

The source of the LF-1 groundwater plume was leachate derived from the three cells (1970 cell, post-1970 cell, and Kettle Hole) of the main MMR landfill which were capped in 1995. The LF-1 plume extends from the landfill to approximately 18,000 feet to the west-southwest where the northern lobe discharges to Red Brook Harbor and the southern lobe discharges to Squeteague Harbor ([Figure 1-2](#)).

As discussed above, groundwater data collected during 1989-90 indicated that significant contamination was not emanating from the older NWOU cells (ANG 1993a). An environmental justification report indicated that the NWOU was not a source of contamination and that it did not pose a public health risk or environmental hazard (ANG 1991). Results of the Final RI confirmed findings from previous investigations, i.e., the NWOU is not an ongoing source of groundwater VOC contamination (AFCEE 1996). The Data Gap Supplemental RI also found no VOC contamination above applicable groundwater cleanup standards that could be attributed to the NWOU (AFCEE 1999). As of May 2013, there has not been a detection of a VOC above applicable groundwater cleanup standards that could be attributed to the NWOU in 28 years of monitoring (56 years after the last NWOU cell [1957] was closed). Therefore, NWOU groundwater was not included in the LF-1 groundwater remedy in the ROD (AFCEE 2007). Further details regarding historical investigations and

correspondence related to the NWOU are included in the updated PCM plan (AFCEE 2012).

The NWOU is currently regulated by MassDEP permit pursuant to M.G.L. c.111, s.150A and the Massachusetts Solid Waste Regulations, 310 CMR 19.000. A Provisional Approval with Conditions, Application for BWP SW23 Comprehensive Site Assessment & Corrective Action Alternative Analysis, Transmittal # W070768 was issued on 20 April 2007 for the NWOU which required, among other conditions, landfill gas monitoring and a 30-year period of post-closure groundwater monitoring (AFCEE 2012). Upon finalization of this ESD, the NWOU will no longer be regulated by MassDEP, but instead will be regulated by EPA pursuant to CERCLA.

2.3 LF-1 SOURCE AREA EXISTING SELECTED REMEDY

For the purpose of explaining the differences between the source area remedy that was identified in the LF-1 ROD and the changes proposed by this ESD, the text from the final ROD was revised in red-line strikeout mode and is presented in [Appendix A](#). In order to avoid uncertainty, all of the text from the sections of the ROD that required editing is provided in [Appendix A](#). As such, the ROD text occasionally cites figures, appendices, references, etc. that are not included in this ESD in the interest of brevity. For complete access to cited materials such as figures, appendices, and references, the reader is directed to the original ROD which is available from the Administrative Record at the AFCEC IRP Office.

3.0 BASIS FOR THE DOCUMENT

The ROD stated that the NWOU would be addressed in a future decision document (AFCEE 2007). The NWOU was excluded from the LF-1 ROD due to EPA concerns regarding surface soil contamination related to Old GP-2 and Old GP-3 that were established on the 1947, 1951, and 1957 NWOU cells in the late 1930s or early 1940s and were used until the late 1940s to early 1950s (ARNG 2011). Soil sampling conducted at Old GP-2 by the IAGWSP indicated polycyclic aromatic hydrocarbon (PAH) detections above MassDEP Massachusetts Contingency Plan (MCP) Soil-1/Groundwater-1 (S-1/GW-1) Standards, indicating that potential risk associated with exposure through direct contact to this soil could not be ruled out. However, the PAH concentrations are not considered a leaching threat to groundwater (IAGWSP 2012). Given that Old GP-2 is located on the NWOU at LF-1 with a native soil cover and restricted access provided by the perimeter fence line, it was determined that the PAH detections do not to present a risk under current institutional controls and land use restrictions. As a result, the EPA and MassDEP approved a No-Further Action decision for the Army GP sites in a Decision Document (IAGWSP 2012) completed under the Safe Drinking Water Act Administrative Order with the understanding that the LUCs (provided in Section 2.11.2 of [Appendix A](#)) that apply to the LF-1 source area as specified in the LF-1 ROD (AFCEE 2007) under CERCLA would be extended to the NWOU via this ESD. Therefore, this ESD formally extends the LUCs for the LF-1 source area to the NWOU (already within the perimeter fence line) to ensure that access to the NWOU soil is controlled.

4.0 DESCRIPTION OF SIGNIFICANT DIFFERENCES AND EXPECTED OUTCOMES

This section describes the differences between the selected remedy for the LF-1 source area as described in the ROD (AFCEE 2007) and the expected outcome of the changes resulting from this ESD (as shown in [Appendix A](#) in red-line strikeout mode). The following subsections describe the rationale for deviating from the selected remedy as originally described in the ROD.

4.1 SIGNIFICANT DIFFERENCES FROM THE SELECTED REMEDIES

The NWOU was excluded from the LF-1 source area remedy in the ROD (AFCEE 2007) due to the need to further investigate soil contamination issues associated with Old GP-2 and Old GP-3, which have been resolved (IAGWSP 2012). The purpose of this ESD is to formally extend the LUCs that are in place for the LF-1 source area remedy to the NWOU (already within the perimeter fence line) to ensure that access to the NWOU soil by human receptors is prevented.

There are two general types of text changes to the ROD as a result of this ESD (as shown in [Appendix A](#)):

1. Definition of the LF-1 Source Area. The ROD specifically stated that the source area remedy applied to the capped landfill cells (the 1970 Cell, the Post-1970 Cell, and the Kettle Hole). The revised text in [Appendix A](#) either removes that detailed description and refers to the source area in general terms, or expands upon the detailed description to include the NWOU cells as part of the LF-1 source area.
2. Statements that the NWOU will be addressed in a future decision document. Those statements have been removed in [Appendix A](#).

The addition of the NWOU cells to the LF-1 source area remedy only changes the breadth of the LUCS, but does not alter or change the remedy type. There are no additional PCM tasks required for the NWOU cells since they were determined not to be a source of groundwater contamination and therefore, were not capped. Maintenance of

the perimeter fence, monitoring wells and gas vents near the NWOU will continue as defined in the recently updated PCM plan (AFCEE 2012).

4.2 EXPECTED OUTCOMES

The differences in the remedial action presented in Section 4.1 of this ESD expands the area addressed by the LUCs, but do not fundamentally alter the source area remedy selected in the LF-1 ROD with respect to scope, performance, or cost.

5.0 STATUTORY DETERMINATION

This ESD modifies the remedy for the IRP LF-1 source area at the MMR as presented in the ROD (AFCEE 2007). The LF-1 source area remedy, along with the groundwater remedy, are protective of human health and the environment, comply with federal and Commonwealth of Massachusetts requirements that are legally applicable or relevant and appropriate to the remedial action, and are cost-effective. The IRP LF-1 source area and groundwater remedies together utilize permanent solutions to the maximum extent practicable, and satisfy the statutory preference for remedies that employ treatment that reduces toxicity, mobility, or volume as a principal element, in accordance with Section 121 of CERCLA. While the changes and clarifications contained in this ESD are significant, none of the proposed changes fundamentally change the LF-1 source area remedy with respect to scope, performance, or cost.

6.0 STATE AGENCY COMMENTS AND PUBLIC PARTICIPATION ACTIVITIES

As part of the ESD review process, the regulatory agencies (EPA and MassDEP) were given the opportunity to comment on the draft version of this ESD. Responses to the regulatory agency comments were documented in a 06 September 2013 Response to Comments Letter. Both agencies concurred with the AFCEE's responses on 06 September 2013.

6.1 CONCURRENCE FROM THE MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION

MassDEP concurrence with this ESD can be found in [Appendix B](#).

6.2 PUBLIC PARTICIPATION ACTIVITIES

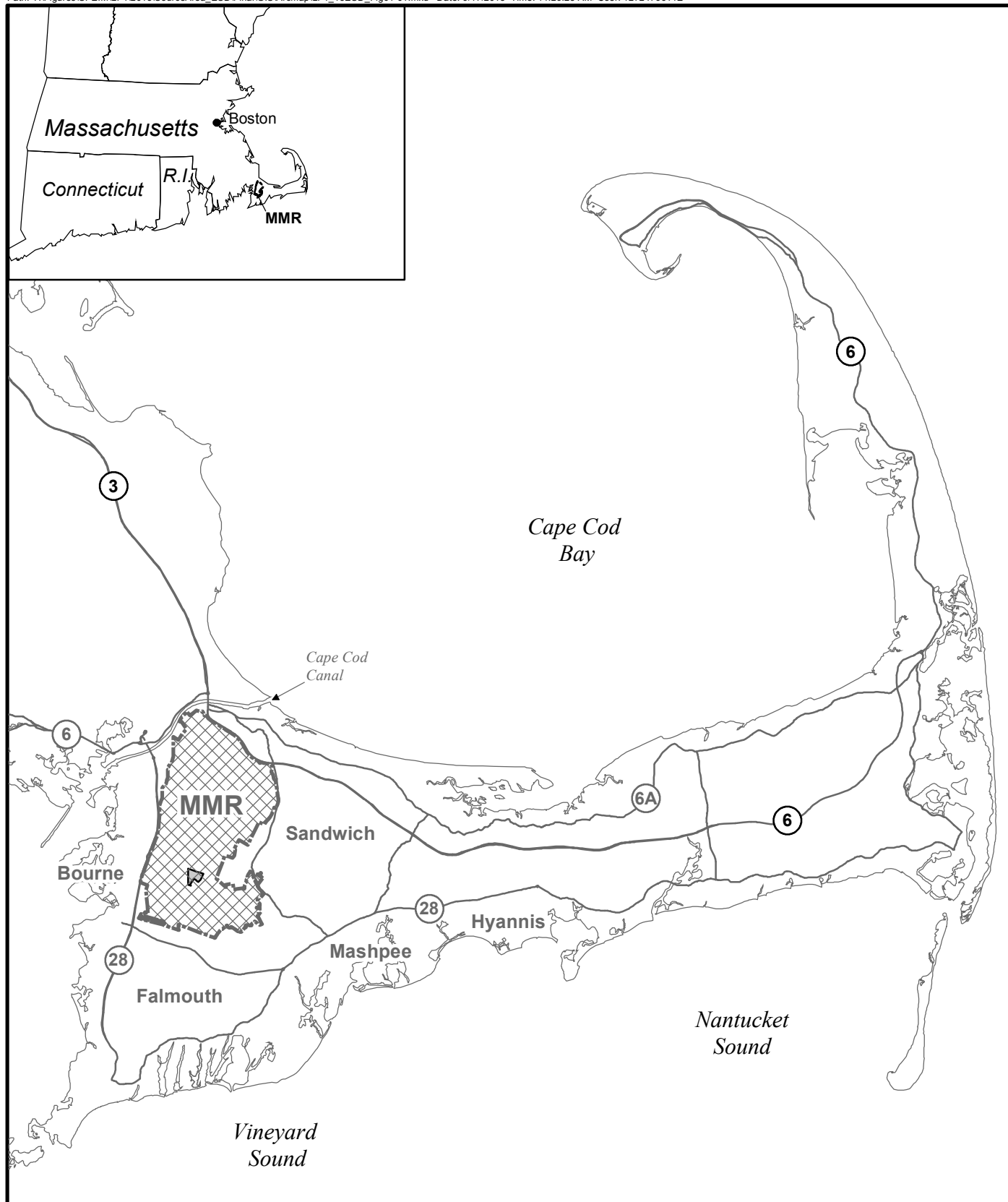
In accordance with Section 117(d) of CERCLA, 42 United States Code §9617(D), AFCEC will publish a notice in the Cape Cod Times and the Falmouth Enterprise that describes this ESD and its availability in the Administrative Record. In accordance with 40 CFR Section 300.435(c)(2)(i) and 300.825(a)(2), this ESD and all documents that support the changes and clarifications are contained in the Administrative Record for the IRP at MMR.

7.0 REFERENCES

- ABB Environmental Services, Inc. (ABB-ES). 1992 (June). *Final Focused Feasibility Study for the Main Base Landfill (AOC LF-1)*. Prepared by HAZWRAP for the Installation Restoration Program, Otis ANG Base, MA.
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- _____. 2007 (September). *Final Record of Decision for Landfill-1 Source Area and Groundwater*. A4P-J23-35BC02VA-M26-0001. Prepared by Jacobs Engineering for AFCEE/MMR, Installation Restoration Program, Otis ANG Base, MA.
- _____. 1999 (November). *Data Gap Supplemental Remedial Investigation Final Report Area of Concern: LF-1 NWOU*. Prepared by Stone & Webster Engineering Corporation for AFCEE/MMR Installation Restoration Program, Otis Air National Guard Base, MA.
- _____. 1996 (September). *Final Remedial Investigation, Main Base Landfill (AOC LF-1) and Hydrogeologic Region I Study*. Prepared by CDM Federal Programs Corporation for AFCEE/MMR, Installation Restoration Program, Otis ANG Base, MA.
- ANG. 1993a (September). *Post-Closure Plan for Main Base Landfill (AOC LF-1)*. Massachusetts Military Reservation, Cape Cod, Massachusetts. Prepared by ABB-ES for Hazardous Waste Remedial Actions Program, Oak Ridge National Laboratory, Oak Ridge, TN.
- _____. 1993b (January). *Record of Decision Interim Remedial Action Main Base Landfill (AOC LF-1) Source Area Operable Unit*. Massachusetts Military Reservation, Cape Cod, Massachusetts. Prepared for Hazardous Waste Remedial Actions Program, Oak Ridge National Laboratory, Oak Ridge, TN.
- _____. 1992 (April). *Closure Plan for Study Area LF-1 1970 Cell, Post-1970 Cell, and Kettle Hole Technical Specifications (90 Percent Design)*. Prepared for the Otis ANG Base, MA by HAZWRAP.
- _____. 1991 (May). *Environmental Justification Report, Study Area LF-1 Northwest Operable Unit*. Prepared for the Otis ANG Base, MA by HAZWRAP.
- _____. 1985 (October). *Installation Restoration Program Phase II –Confirmation/Quantification Stage 1*. Prepared by Weston for the Otis ANG Base, MA.

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- _____. 1988 (July). *Field Investigations, Summer/Fall 1986; Task 2-1; Base Landfill, Petroleum Fuels Storage Area, and Fire-Training Area*. Prepared by E.C. Jordan Co. for HAZWRAP Support Contractor Office, Oak Ridge National Laboratory, Oak Ridge, TN.
- EPA. 1999 (July). *A Guide to Preparing Superfund Proposed Plans, Records of Decision, and Other Remedy Selection Decision Documents*. EPA 540/R-98/031, OSWER 9200.1-23P.
- EPA Region I, Department of the Air Force National Guard Bureau, and the U.S. Coast Guard. 2002 (June). *Federal Facility Agreement (FFA) Under CERCLA S120 and RCRA S7003 for the Massachusetts Military Reservation* as amended.
- EPA Region I and the United States Department of Defense, National Guard Bureau. 1991 (and subsequently amended). *Federal Facility Agreement Under CERCLA § 120 and RCRA § 7003* In the matter of: The U.S. Department of Defense, National Guard Bureau, Massachusetts Military Reservation, Cape Cod, MA.
- IAGWSP. 2012 (September). *Decision Document, Former A Range, Former K Range, and Gun and Mortar Positions*. Prepared for Camp Edwards, Massachusetts Military Reservation, Cape Cod, MA.

FIGURES



Legend



Massachusetts Military Reservation



LF-1 Source Area

Data Source: AFCEC, MMR-AFCEC Data Warehouse



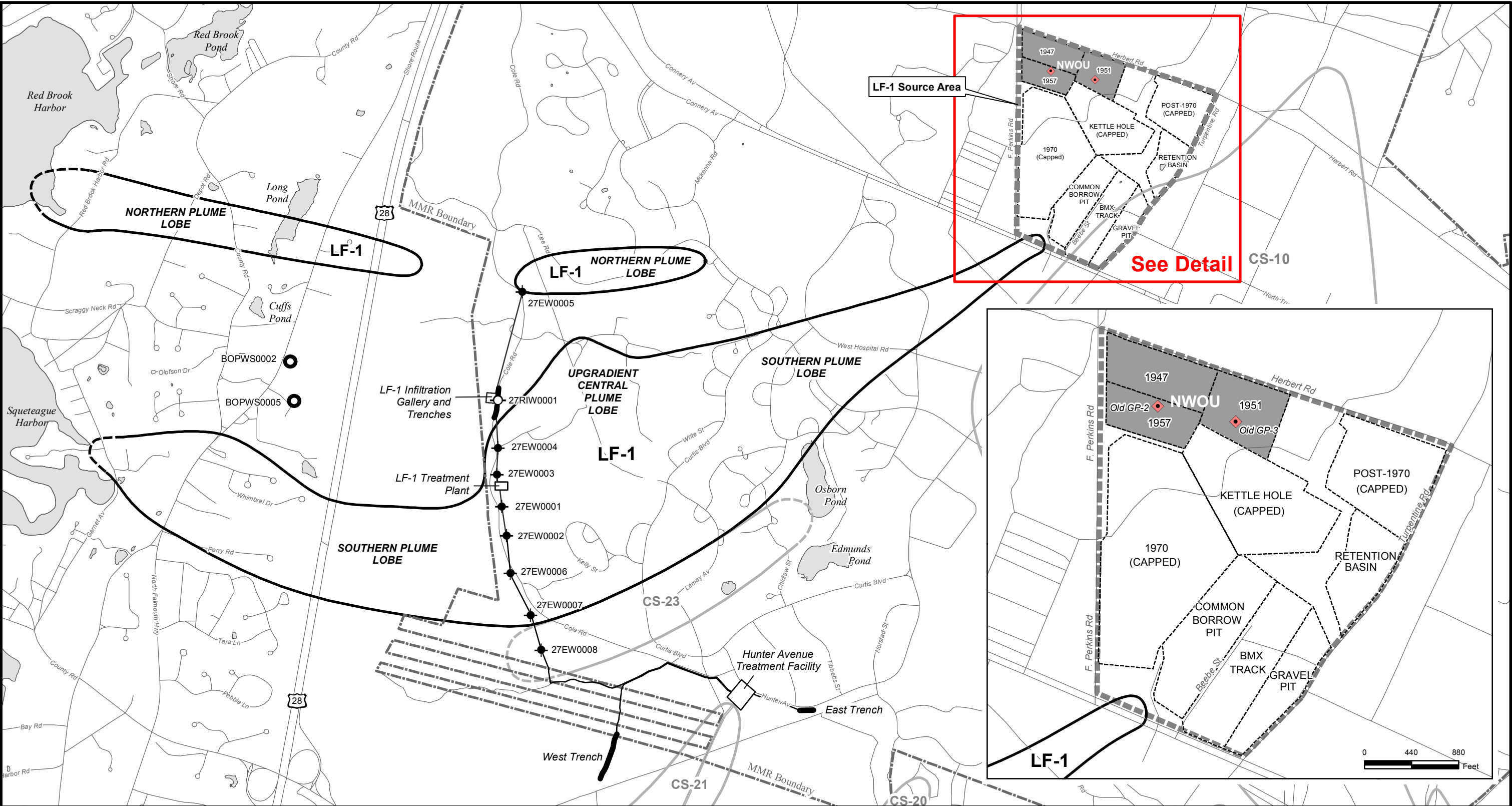
0 3 6
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FIGURE 1-1

MASSACHUSETTS MILITARY RESERVATION, CAPE COD, MASSACHUSETTS

AFCEC - Massachusetts Military Reservation
Final Explanation of Significant Differences for the
LF-1 Source Area at the Massachusetts Military
Reservation

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Legend

- | | | |
|-----------------------------------|---|---|
| ◆ Extraction Well | ▨ Northwest Operable Unit (NWOU) | — Other AFCEE Plume Boundary |
| ○ Reinjection Well | ▤ LF-1 Source Area | — Infiltration Trench/Gallery |
| ● Bourne Public Water Supply Well | — LF-1/CS-23 Treatment System Pipeline | --- Landfill Boundary |
| ◆ Historic Gun Position | — LF-1 Plume Boundary (Dashed Where Inferred) | --- Massachusetts Military Reservation Boundary |
| □ Treatment Plant | | |

Data Source: AFCEC, April 2013, AFCEC-MMR Data Warehouse
MMR Boundary from Massachusetts Air National Guard 2011

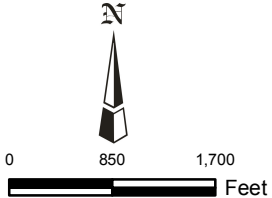


FIGURE 1-2

LF-1 SOURCE AREA, GROUNDWATER PLUME AND LF-1 AND HUNTER AVENUE TREATMENT SYSTEMS

AFCEC - Massachusetts Military Reservation
Final Explanation of Significant Differences for the LF-1 Source Area at the Massachusetts Military Reservation

APPENDIX A

LF-1 ROD Source Area Remedy Text Changes

Section 1 of the LF-1 ROD (AFCEE 2007) will be revised by this ESD as follows (in italics):

1.0 DECLARATION

1.1 SITE NAME AND LOCATION

The Massachusetts Military Reservation (MMR) on Cape Cod Massachusetts is located within the boundaries of the towns of Bourne, Mashpee, Sandwich, and Falmouth. This site is listed on the National Priorities List (NPL) as Otis Air National Guard/Camp Edwards in Falmouth, Massachusetts. This Record of Decision (ROD) addresses ~~part of~~ the Landfill-1 (LF-1) source area, ~~specifically the 1970 Cell, the Post 1970 Cell, and the Kettle Hole,~~ and the LF-1 groundwater. The Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) number for the MMR site is MA2570024487.

1.2 STATEMENT OF BASIS AND PURPOSE

This ROD presents the selected remedy for ~~a portion of~~ the LF-1 source area, specifically the 1970 Cell, the Post-1970 Cell, ~~and~~ the Kettle Hole, and the Northwest Operable Unit (NWOU) (the 1947, 1951 and 1957 cells), and the LF-1 groundwater, which was chosen in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, as amended by the Superfund Amendments and Reauthorization Act, and to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). This decision is based on the Administrative Record for this site. ~~The northwest part of the LF-1 source area (the 1947, 1951, and 1957 cells) will be addressed in a future decision document.~~

The U.S. Department of Defense (DOD) (U.S. Air Force) is the lead agency for CERCLA remedial actions at the MMR. The U.S. Environmental Protection Agency (EPA), the U.S. Air Force, and the National Guard Bureau (NGB) are parties to the Federal Facility Agreement (FFA) (EPA et al. 2002) for this site. They, along with the Massachusetts Department of Environmental Protection (MassDEP), concur with the selected remedy.

1.3 ASSESSMENT OF THE SITE

The response action selected in this ROD is necessary to protect the public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment.

1.4 DESCRIPTION OF SELECTED REMEDY

The selected remedy for the LF-1 source area ~~(the 1970 Cell, Post-1970 Cell, and the Kettle Hole)~~ provides for continued monitoring and maintenance of the existing landfill cover system. The objective of the remedy is to maintain the integrity of the landfill cover system to retard leaching of contamination that would cause downgradient groundwater to be unusable and implement land use controls (LUCs) to prevent exposure to landfill waste. The native soil and vegetative cover over the NWOU cells (1947, 1951 and 1957 cells) will not be altered.

The selected remedy for the LF-1 groundwater provides for continued active treatment of the LF-1 plume with the existing extraction, treatment, and infiltration (ETI) system with an expansion of the system to improve capture of the southern lobe at the base boundary. The system expansion involved installation of a sixth extraction well in the LF-1 plume (27EW0006), from which water is processed at the Hunter Avenue Treatment Facility and returned to the aquifer through infiltration. The objective of this remedy is to continue to operate, maintain, and optimize the existing, expanded ETI system to expedite aquifer restoration, maintain containment of the plume upgradient of a point approximately 800 feet west of the base boundary, and implement LUCs to reduce residential exposure to the LF-1 plume. The ETI system consists of ETI of groundwater following federal and state standards for the tetrachloroethene (PCE), trichloroethene (TCE), carbon tetrachloride (CCl₄), 1,4-dichlorobenzene, vinyl chloride, and 1,1,2,2-tetrachloroethane (1,1,2,2-TeCA) as stipulated in the current Operations and Maintenance (O&M) Plan. The remedy leaves open the possibility of modifying the treatment system to optimize the cleanup time frame and maintain containment of the plume upgradient of a point approximately 800 feet west of the base boundary. Most

likely, modifications will be implemented using the existing extraction wells and infiltration trenches and gallery, and could involve well packering (decreasing the effective length of the well screen through installation of a well packer), turning on or off existing extraction wells and infiltration trenches or galleries, or adjusting flow rates. This remedy, however, does not exclude the possibility of adding system components, such as additional extraction wells, if deemed necessary. Modifications will be made for the purpose of improving treatment system operation, expediting plume cleanup, and maintaining containment of the plume upgradient of a point approximately 800 feet west of the base boundary. This remedy will also provide for chemical and hydraulic monitoring of the plume as long as active remediation continued. After active ETI becomes no longer effective at expediting plume cleanup, the Air Force Center for Engineering and the Environment (AFCEE), with regulatory agency input, will cease operation of the ETI system and will continue to monitor the residual plume contamination until the remedial action objectives (RAOs) have been met. The monitoring of the plume will be conducted as part of the system performance and ecological impact monitoring (SPEIM) program. This remedy provides the flexibility of modifying the monitoring network as necessary to adequately monitor the LF-1 plume and optimize system performance. LUCs will reduce potential human exposure to contaminated groundwater. Five-year reviews will be performed to determine if the remedy is still appropriate and protective. A residual risk assessment and/or evaluation of the technical and economic feasibility of additional remediation to approach background concentrations will be performed if necessary.

1.5 STATUTORY DETERMINATIONS

The selected LF-1 source area ~~(the 1970 Cell, Post 1970 Cell, and the Kettle Hole)~~ remedy and the LF-1 groundwater remedy are protective of human health and the environment, comply with federal and Commonwealth of Massachusetts requirements that are applicable or relevant and appropriate requirements (ARARs) for the remedial action, utilize permanent solutions to the maximum extent possible, and are cost effective. The remedies also satisfy the statutory preference for treatment as a principal element of

the remedy (i.e., reduces the toxicity, mobility, or volume of hazardous substances, pollutants, or contaminants, as a principal element through treatment). Because hazardous substances are expected to remain in the source area and in the aquifer for a number of years above levels that allow for unlimited use and unrestricted exposure, five-year reviews will be conducted to ensure that the remedies continue to be protective of human health and the environment.

1.6 DATA CERTIFICATION CHECKLIST

The following information is included in the Decision Summary (Section 2.0) section of this ROD. Additional information can be found in the Administrative Record for this site.

<i>Data Item</i>	<i>Location in Document</i>
<i>Contaminants of Concern (COCs) and their respective concentrations.</i>	<i>Section 2.7.5</i>
<i>Baseline risk represented by the COCs.</i>	<i>Section 2.7</i>
<i>Cleanup levels established for the COCs and the basis for these levels.</i>	<i>Section 2.8</i>
<i>How source materials constituting principal threats will be addressed.</i>	<i>Section 2.2</i>
<i>Current and reasonable anticipated future land use assumptions and current and potential future beneficial use of groundwater used in the baseline risk assessment and the ROD.</i>	<i>Section 2.6</i>
<i>Potential land and groundwater use that will be available at the site as a result of the selected remedy.</i>	<i>Section 2.8</i>
<i>Estimated annual and total present value costs, discount rate, and the number of years over which the remedy cost estimate is projected.</i>	<i>Sections 2.11.3 (LF-1 source area) and 2.13.3 (LF-1 groundwater)</i>
<i>Key factor(s) that led to selecting the remedy.</i>	<i>Sections 2.10.2, 2.12 (LF-1 source area) and Sections 2.10.3, 2.14 (LF-1 groundwater)</i>

1.7 AUTHORIZING SIGNATURES

The foregoing represents the decision for remedial action for ~~a portion of~~ the LF-1 source area, ~~specifically the 1970 Cell, the Post-1970 Cell, and the Kettle Hole,~~ and the LF-1 groundwater by AFC EE and the EPA, with the concurrence of the MassDEP.

Section 2.0 of the LF-1 ROD (AFCEE 2007) will be revised by this ESD as follows (in italics):

2.0 DECISION SUMMARY

The following sections describe the setting, potential risks, RAOs, and alternative evaluation for remediation of the LF-1 source area ~~(the 1970 Cell, Post 1970 Cell, and the Kettle Hole)~~ and the LF-1 groundwater.

Section 2.4 of the LF-1 ROD (AFCEE 2007) will be revised by this ESD as follows (in italics):

2.4 SCOPE AND ROLE OF OPERABLE UNIT

The LF-1 site was organized into separate operable units (OU), focusing on source area and groundwater. This ROD addresses ~~a portion of the source area, specifically the 1970 Cell, the Post 1970 Cell, and the Kettle Hole~~ (Figure 2-3); and ~~the~~ groundwater OU (Figure 2-5).

The LF-1 area is located along the west-southwest edge of the MMR where, through the IRP, AFCEE is responsible for the cleanup of contamination from past military practices. The NGB is actively investigating and remediating soil and groundwater contamination in the northern portion of the base (north of the LF-1 site) as part of the Impact Area Groundwater Study Program.

Section 2.6 of the LF-1 ROD (AFCEE 2007) will be revised by this ESD as follows (in italics):

2.6.1 Land Use

The capped cells of the LF-1 source area (1970 Cell, Post-1970 Cell, and the Kettle Hole) ~~are~~^{is} currently being maintained as a capped landfill. It is anticipated that the land use in the source area will not change significantly over time. Source area controls, in the form of environmental land use restrictions, are in place that protect human health by limiting exposure to the landfill source areas and preventing intrusive activities on the landfill.

Sections 2.11, 2.11.1 and 2.11.2 of the LF-1 ROD (AFCEE 2007) will be revised by this ESD as follows (in italics):

2.11 SELECTED REMEDY FOR THE LF-1 SOURCE AREA OPERABLE UNIT

Based on the Administrative Record for the LF-1 site and the evaluation of comments received by interested parties during the public comment period, AFCEE has selected Alternative 2 as the remedy for the LF-1 source area, including specifically the 1970 Cell, Post-1970 Cell, ~~and~~ Kettle Hole, and the Northwest Operable Unit (NWOU) (1947, 1951, and 1957 cells).

2.11.1 Summary of the Rationale for the Selected Remedy

AFCEE's preferred remedial alternative for the LF-1 source area ~~(the 1970 Cell, Post-1970 Cell, and Kettle Hole)~~ is Alternative 2—Status Quo of the Landfill with Land Use Controls. The Final Landfill-1 Source Area and Groundwater Feasibility Study (AFCEE 2006b) evaluated both remedial alternatives according to the threshold and balancing criteria. Alternative 2 meets the threshold criteria (complies with applicable requirements and is protective of human health and the environment). AFCEE believes Alternative 2 provides the best balance of tradeoffs between the two alternatives with respect to the balancing criteria.

Risks to human health that are related to the landfill source area have already been controlled. The IRP constructed a landfill cover system, including a perimeter fence that prevents contact with the landfill waste. The existing landfill cover system prevents the formation of leachate that would cause groundwater downgradient to be unusable. The following discussion summarizes the comparison of LF-1 source area remedial alternatives in the context of the threshold criteria (overall protection of human health and the environment, and compliance with ARARs and balancing criteria (long-term effectiveness, short-term effectiveness, reduction of toxicity, mobility, or volume through treatment, implementability, and cost).

2.11.2 Detailed Description of Selected Remedy

Under the selected remedy, the existing landfill cover system (low permeability landfill cap, associated fence [installed around the entire landfill], gas vents, and drainage system) over the 1970 Cell, Post-1970 Cell, and Kettle Hole would not be altered (Figure 2-3). Site-condition monitoring, site-settlement monitoring, and periodic maintenance will continue until waste left in place no longer poses a risk to human health and the environment. The native soil and vegetative cover over the NWOU cells (1947, 1951 and 1957 cells) will not be altered. CERCLA five-year reviews will be performed to evaluate remedy appropriateness and site status until the waste left in place no longer poses a risk to human health and the environment. ~~The northwest part of the LF-1 source area (the 1947, 1951, and 1957 cells) will be addressed in a future decision document.~~

Site monitoring (visual inspections) and reporting documents the physical condition of the landfill cover system including the perimeter fence around the entire landfill and the vegetative cover, monitoring wells, gas probes, gas vents, and the drainage system while identifying maintenance needs of the cover system over the 1970 Cell, Post-1970 Cell, and Kettle Hole. Monitoring of concentrations of landfill gas by gas probes located at the perimeter of the landfill will be performed. Settlement monitoring will be performed to verify the slopes are maintained to shed precipitation from the cap and to verify that the cap thickness is adequate to retard leaching of contaminants. Periodic maintenance will be performed to retain the integrity of the landfill cover system. Maintenance activities performed at the landfill include mowing the cover system once per year, clearing drainage culverts, and repairing areas damaged by erosion. Monitoring results would be provided in formal reports.

The following text describes the LUCs that will be implemented for both the LF-1 source area selected remedy and the LF-1 groundwater selected remedy discussed in Section 2.13 of this report. Exposure to the waste at the NWOU and beneath the LF-1 landfill cover system could pose an unacceptable risk to human health. The LF-1 contaminated groundwater currently poses an unacceptable risk to human health if used for household purposes (i.e., ingestion, dermal contact, and inhalation of vapors released during household use of water).

The LF-1 source area is located in the middle of the cantonment area. The LF-1 contaminated groundwater is located in the western part of the MMR cantonment area, and a portion of the contaminated groundwater has migrated past the MMR boundary into the neighboring towns of Bourne and Falmouth. Therefore, administrative and/or legal controls that minimize the potential for human exposure to contamination by limiting land or resource use, known as “LUCs,” must be established for the LF-1 source area and groundwater to avoid the risk of exposure to the LF-1 source area and LF-1 groundwater. These LUCs are needed both on-base and off-base, within the towns of Bourne and Falmouth, until the LF-1 source area and contaminated groundwater no longer poses an unacceptable risk.

The performance objectives of the LUCs are to

- *Prevent access to waste and soils beneath the NWOU and the LF-1 cover system until the waste and soils no longer pose an unacceptable risk,*
- *Prevent or reduce access to or use of the groundwater from the LF-1 contaminated groundwater until the groundwater no longer poses an unacceptable risk, and*
- *Maintain the integrity of the current or future remedial or monitoring system such as the landfill cover system, the treatment systems, and monitoring wells.*

The LUCs will encompass the area including the LF-1 source area and contaminated groundwater and surrounding areas to reduce the risk from exposure to contaminated groundwater (Figure 2-11). The on-base area of concern is controlled and operated by the USCG and the Air Force, who lease this land from the Commonwealth of Massachusetts. It is expected that these entities (USCG and U.S. Air Force) will control the area of concern and the surrounding area for the duration of this ROD. As a result, the Air Force will coordinate with the Commonwealth of Massachusetts as the Air Force fulfills its responsibility to establish, monitor, maintain, and report on the LUCs for this site.

Each LUC will be maintained until either (1) the concentrations of COCs in the groundwater are at such levels as to allow unrestricted use and exposure and the landfill waste and soils no longer pose an unacceptable risk, or (2) the Air Force, with the prior approval of the EPA and MassDEP, modifies or terminates the LUC in question.

The Air Force is responsible for ensuring that the following three LUCs are established, monitored, maintained, and reported on as part of this final remedy to ensure protection of human health and the environment in accordance with CERCLA and the NCP for the duration of the final remedy selected in this ROD. The Commonwealth of Massachusetts only has enforcement authority regarding the third LUC. In the event that the Town of Bourne fails to promptly enforce the first LUC and/or the Town of Falmouth fails to promptly enforce the second LUC or the Commonwealth of Massachusetts fails to promptly enforce the third LUC, the Air Force will act in accordance with the third to last paragraph in this section. For purposes of the preceding sentence, “promptly enforce” means if the violation or potential violation is imminent or on-going, enforce to prevent or terminate the violation within 10 days from the enforcing agency’s (i.e., the Town or the Commonwealth) discovery of the violation or potential violation; otherwise, enforce as soon as possible.

- 1) On 24 September 2003, to better protect the public health and welfare of its citizens, the Bourne BOH, voted to amend the private well construction regulations originally adopted on 23 February 2000. The BOH will not approve construction of a well intended for human water consumption or irrigation if the well is known to be over a plume of contamination or in the direct path of an advancing plume of contamination. The Bourne BOH Well Regulations do not apply to use of existing drinking water wells and irrigation wells. The regulations are reproduced in Appendix C. To assist the Bourne BOH in the implementation of this LUC, the Air Force will meet with the BOH on an annual basis, or more frequently if needed, to provide and discuss plume maps that document the current and projected location of the LF-1 contaminated groundwater within the town of Bourne. While Figure 2-11 shows the current area of LUCs in the town, the Bourne BOH may modify the areas subject to the moratorium, and this LUC will apply to such areas even if they differ from the area shown in Figure 2-11.*
- 2) The Falmouth BOH requires a permit for the installation and use of all wells, including drinking water wells, irrigation wells, and monitoring wells. If a permit to install a drinking water well is approved, the Falmouth BOH will not approve the use of that well until its water has been tested and the BOH has determined*

that the water is potable. The Falmouth BOH Water Well Regulations do not apply to use of existing drinking water wells and irrigation wells. The regulations, which are reproduced in Appendix D, cover documented and anticipated areas of contamination from the LF-1 plume. To assist the Town of Falmouth in the implementation of this LUC, the Air Force will meet with the BOH on an annual basis, or more frequently if needed, to provide and discuss plume maps that document the current and projected location of the LF-1 plume within the town of Falmouth. While Figure 2-11 shows the current area of LUCs in the town, the Falmouth BOH may modify the areas where well use is excluded, and this LUC will apply to such areas even if they differ from the area shown in Figure 2-11.

- 3) In addition to the towns of Bourne and Falmouth BOH regulations, which generally applies to small water supply wells, existing LUCs also prevent the possible creation of a large potable water supply well. The MassDEP administers a permitting process for any new drinking water supply wells in Massachusetts that propose to service more than 25 customers or exceed a withdrawal rate of 100,000 gallons per day. This permitting process, which serves to regulate the use of the LF-1 contaminated groundwater for any withdrawals of groundwater for drinking water purposes, constitutes an additional LUC for this final remedy. This LUC applies to both on-base and off-base portions of LF-1.*

The Air Force has provided municipal water supply hook-ups for all residences in areas of current or anticipated groundwater contamination. In conjunction with the Bourne BOH Well Regulations and the Falmouth BOH Water Well Regulations, the municipal water supply hook-ups significantly reduce the likelihood of exposure to contaminated groundwater from existing wells and from any future wells installed in areas of anticipated contamination. Additionally, the Air Force is responsible for ensuring that the following LUCs are established, monitored, maintained, reported on, and enforced as part of this final remedy to ensure protection of human health and the environment in accordance with CERCLA and the NCP for the duration of this final remedy selected in this ROD.

- 1) For the on-base area of concern, a prohibition on new drinking water wells serving 25 or fewer customers has been established and placed on file with the planning and facilities offices for the Massachusetts Air and Army National Guard and USCG (major tenants at the MMR). The prohibition will be applied to future land use planning per Air National Guard Instruction (ANGI) 32-1003, Facilities Board, Army National Guard Regulation 210-20, Real Property Development Planning for the Army National Guard, and Commandant Instruction Manual 11010.14, Shore Facility Project Development Manual.*

- 2) *For the on-base area of concern, the Air National Guard has administrative processes and procedures that require approval for all projects involving construction or digging/subsurface soil disturbance, currently set forth in ANGI 32-1001, Operations Management. This procedure is a requirement of the Army National Guard and the USCG by the Air National Guard through Installation Support Agreements. The Air National Guard requires a completed AF Form 103, Base Civil Engineer Work Clearance Request (also known as the base digging permit), prior to allowing any construction, digging or subsurface soil disturbance activity. All such permits are forwarded to the IRP for concurrence before issuance. An AF Form 103 will not be processed without a Dig Safe permit number (see next paragraph).*
- 3) *The Dig Safe program implemented in Massachusetts provides an added layer of protection to prevent the installation of water supply wells in the LF-1 source and groundwater areas and to protect monitoring wells and the treatment system's infrastructure. This program requires, by law, anyone conducting digging activities (e.g., well drilling) to request clearance through the Dig Safe network. The Air Force at the MMR is a member utility of Dig Safe. The LF-1 source area and groundwater plume are encompassed by a geographical area identified by the Air Force as a notification region within the Dig Safe program. Through the Dig Safe process, the Air Force will be electronically notified at least 72 hours prior to any digging within this area. The notification will include the name of the party contemplating, and the nature of, the digging activity. The Air Force will review each notification and if the digging activity is intended to provide a well, which has not been approved via the procedures above, the Air Force will immediately notify the project sponsor (of the well drilling), the EPA, the Bourne BOH or the Falmouth BOH, and the MassDEP in order to curtail the digging activity. If the Dig Safe notification indicates proposed work near monitoring wells or the treatment system infrastructure, the Air Force will mark its components to prevent damage due to excavation. This LUC applies to both on-base and off-base portions of the LF-1 source area and plume. The extent of the Air Force's enforcement of this LUC does not address off-base parties failing to file a Dig Safe request nor Dig Safe improperly processing a notification, but if incidents do occur, the Air Force is responsible for ensuring remedy integrity and, if necessary, repairing damage cause by third parties to the remedial system infrastructure or monitoring wells.*

The LUCs are intended to prevent exposure to groundwater impacted by the LF-1 plume; however, to insure that the LUCs obtain the LUC performance objectives the Air Force will take the following action.

Within three years of the signing of the ROD, the Air Force shall:

- a. *Document all private wells (i.e. non-decommissioned wells, including wells not currently in use) that are above or within the projected path of the LF-1 plume.*

- b. Demonstrate and document that the private well is not capable of drawing contaminated groundwater originating from the LF-1 plume, or test the private well for contamination and demonstrate the private well to be safe for human use. The Air Force will continue such testing, on an appropriate frequency as determined in coordination with the EPA, until the plume no longer presents a threat to that well as determined in coordination with EPA.*
- c. If the Air Force identifies a well containing COCs, the Air Force shall assess the risk current and potential future non-drinking uses of such a well pose to human health. The Air Force shall submit a draft version of any such risk assessment to EPA for review and approval.*
- d. If neither b nor c is able to confirm that the identified well is safe for human use, the Air Force will offer the owner decommissioning of the well. If accepted, the Air Force will document such action with the appropriate BOH. If the decommissioning is not accepted, the Air Force will take other steps to insure protectiveness to include, but not be limited to, requesting assistance from the appropriate BOH to issue health warnings to the property owner and any other person with access to the well (such as a lessee or licensee), offering bottled water (if well is used for drinking), or installing treatment systems on affected wells. In each instance, the Air Force shall submit a schedule subject to EPA approval, outlining and including time limitations for the completion of steps sufficient to prevent exposure to concentrations of contaminated groundwater from the LF-1 plume having carcinogens in excess of ARARs (i.e., MCLs, non-zero MCLGs), and prevent exposure to groundwater from the LF-1 plume that poses a cancer risk in excess of the EPA target risk range of 10^{-4} to 10^{-6} or which presents a non-carcinogenic hazard index greater than one.*

Monitoring of the environmental use restrictions and controls will be conducted annually by the Air Force. The monitoring results will be included in a separate report or as a section of another environmental report, if appropriate, and provided to the EPA and MassDEP for informational purposes. The annual monitoring reports will be used in preparation of the five-year review to evaluate the effectiveness of the final remedy.

The annual monitoring report, submitted to the regulatory agencies by the Air Force, will evaluate the status of the LUCs and how any LUC deficiencies or inconsistent uses have been addressed. The annual evaluation will address (i) whether the use restrictions and controls referenced above were effectively communicated, (ii) whether the operator, owner, and state and local agencies were notified of the use restrictions and controls affecting the property, and (iii) whether use of the property has conformed with such restrictions and controls and, in the event of any violations, summarize what actions have been taken to address the violations.

The Air Force shall notify the EPA and MassDEP 45 days in advance of any proposed land changes that would be inconsistent with the LUC objectives or the final remedy. If the Air Force discovers a proposed or ongoing activity that would be or is inconsistent with the LUC objectives or use restrictions, or any other action (or failure to act) that may interfere with the effectiveness of the LUCs, it will address this activity or action as soon as practicable, but in no case will the process be initiated later than 10 days after the Air Force becomes aware of this breach. The Air Force will notify the EPA and MassDEP as soon as practicable, but no later than 10 days after the discovery of any activity that is inconsistent with the LUC objectives or use restrictions, or any other action that may interfere with the effectiveness of the LUCs. The Air Force will notify the EPA and MassDEP regarding how the Air Force has addressed or will address the breach within 10 days of sending the EPA and MassDEP notification of the breach.

The Air Force will provide notice to the EPA and MassDEP at least six months prior to relinquishing the lease to the LF-1 source area and the LF-1 groundwater area so the EPA and MassDEP can be involved in discussions to ensure that appropriate provisions are included in the transfer terms or conveyance documents to maintain effective LUCs. If it is not possible for the Air Force to notify the EPA and MassDEP at least six months prior to any transfer or sale, then the Air Force will notify the EPA and MassDEP as soon as possible, but no later than 60 days prior to the transfer or sale of any property, subject to LUCs.

The Air Force shall not modify or terminate LUCs, implementation actions, or modify land use without approval by the EPA and MassDEP. The Air Force, in coordination with other agencies using or controlling the LF-1 source area and LF-1 plume area, shall seek prior concurrence before taking any anticipated action that may disrupt the effectiveness of the LUCs or any action that may alter or negate the need for LUCs. The Air Force will provide EPA and MassDEP 30 days' notice of any changes to the internal procedures for maintaining LUCs which may affect LF-1.

APPENDIX B

MassDEP Concurrence Letter



Commonwealth of Massachusetts
Executive Office of Energy & Environmental Affairs

Department of Environmental Protection

Southeast Regional Office • 20 Riverside Drive, Lakeville MA 02347 • 508-946-2700

DEVAL L. PATRICK
Governor

RICHARD K. SULLIVAN JR.
Secretary

KENNETH L. KIMMELL
Commissioner

September 30, 2013

James T. Owens III, Director
Office of Site Remediation and Restoration
U.S. Environmental Protection Agency, Region I
5 Post Office Square Suite 100
Boston, MA 02109-3912

RE: **BOURNE**
Release Tracking Number: 4-0000037
Joint Base Cape Cod (JBCC)
**Explanation of Significant Differences for
the Landfill (LF-1) Source Area at the
Massachusetts Military Reservation,
Concurrence**

Dear Mr. Owens:

The Massachusetts Department of Environmental Protection (MassDEP) has reviewed the document entitled **"Final Explanation of Significant Differences for the Landfill (LF-1) Source Area at the Massachusetts Military Reservation"** (ESD), dated September 2013. The ESD was prepared by CH2M Hill for the Air Force Civil Engineer Center (AFCEC) Installation Restoration Program (IRP) at the Joint Base Cape Cod (JBCC), formerly the Massachusetts Military Reservation (MMR). The ESD documents changes to the selected remedy for the LF-1 source area described in the LF-1 Record of Decision (ROD). The North West Operable Unit (NWOU) portion of the LF-1 source area had been excluded from the LF-1 ROD due to Environmental Protection Agency (EPA) concerns regarding surface soil contamination relating to former Artillery Gun (Gun) Positions used at the NWOU after the landfill cells were closed. The Impact Area Groundwater Study Program (IAGWSP) has addressed EPA's concerns regarding the former gun positions at the NWOU allowing the AFCEC to complete this ESD and incorporate the NWOU into the LF-1 source area remedy.

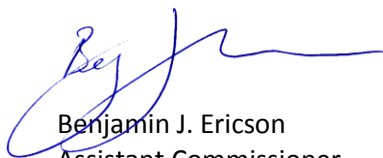
Soil sampling conducted at former Gun Positions by the IAGWSP detected polycyclic aromatic hydrocarbon (PAH) concentrations above Massachusetts Contingency Plan (MCP) Soil-1/Groundwater-1 (S-1/GW-1) Standards, indicating a potential risk associated with exposure through direct contact to this soil. The PAH concentrations are not considered a leaching threat to groundwater and do not present a health risk under current institutional controls and land use restrictions. In 2012, EPA issued a No Further Action decision for the former Gun Positions in a Decision Document issued in accordance with Section 1431(a) of the Safe Drinking Water Act (SDWA), 42 USC §300i (a), as amended, and EPA Administrative Order No. SDWA-1-2000-0014 (AO3) with the understanding that the land use controls (LUCs) that apply to the LF-1 source area as specified in the LF-1 ROD would be extended to the NWOU. Therefore, this ESD extends the LUCs for the LF-1 source area to ensure that access to the NWOU soil is controlled.

The NWOU is currently regulated by a MassDEP permit pursuant to M.G.L. c. 111, s. 150A and the Massachusetts Solid Waste Regulations, 310 CMR 19.000. A Provisional Approval with Conditions, Application for BWP SW23 Comprehensive Site Assessment & Corrective Action Alternative Analysis, Transmittal # W070768 was issued on April 20, 2007 for the NWOU cells. This permit approval required, among other conditions, landfill gas monitoring and a 30 year period of post-closure groundwater monitoring. Upon finalization of the ESD, the NWOU will no longer be regulated by MassDEP under the authority of M.G.L. c. 111, s. 150A and the Massachusetts Solid Waste Regulations, 310 CMR 19.000. Instead, it will be regulated by EPA pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

MassDEP concurs with the ESD. The ESD expands the area addressed by the LF-1 LUCs to include the NWOU, but does not fundamentally alter the source area remedy selected in the LF-1 ROD with respect to scope, performance, or cost. MassDEP's concurrence with the ESD is based upon representations made to MassDEP by the AFCEC and assumes that all information provided is substantially complete and accurate. Without limitation, if MassDEP determines that any material omissions or misstatements exist, if new information becomes available, if LUCs are not properly implemented, monitored and/or maintained or if conditions within any of the IRP groundwater plumes change, resulting in potential or actual human exposure or threats to the environment, MassDEP reserves its authority under M.G.L. c. 21E, CERCLA, the MCP, the NCP and any other applicable law or regulation to require further response actions at LF-1 including, without limitation, additional investigation, remedial measures, and the implementation of LUCs. MassDEP will review relevant information as it becomes available to determine if additional investigative and/or remedial measures are necessary for the protection of public health, safety, welfare or the environment at LF-1. This includes, without limitation, new regulatory requirements or changes in the environmental conditions at LF-1.

Please incorporate this letter into the Administrative Record for the Landfill-1 Source Area. If you have any questions regarding this matter, please contact Leonard J. Pinaud, Chief, State & Federal Sites Management Section at (508) 946-2871 or Millie Garcia-Serrano, Deputy Regional Director of the Bureau of Waste Site Cleanup at (508) 946-2727.

Sincerely,



Benjamin J. Ericson
Assistant Commissioner
Bureau of Waste Site Cleanup

BE/lp/

File : 4-0000037 LF-1 ESD Concurrence Letter 09-2013

Ec: Gary Moran, Deputy Commissioner
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Upper Cape Boards of Selectmen
Upper Cape Boards of Health